Abundance and Number of Shorebird Species along the River Channel.

Expectation: Shorebirds will account for an average of 4-9% of non-passerine river channel bird observations per year. At least 11 species will be present (Table 1), including key indicator species such as Black Skimmer, Lesser and Greater Yellowlegs, and Least Sandpiper.

Author: Stefani L. Melvin, South Florida Water Management District

Date: March 15, 1999

Relevant Endpoints:
Sociopolitical - Number of Birds
Sociopolitical - Diversity of Birds
Sociopolitical - Aesthetic Values
Restoration - Biological Integrity - Community Structure
Restoration - Biological Integrity - Biodiversity
Restoration - System Functional Integrity - Habitat Quality
Restoration - System Functional Integrity - Habitat Use

Baseline Condition: Habitat characteristics of river channels in the channelized system have changed dramatically from historic conditions. The channel bottom is composed of significantly more organic matter, while littoral vegetation has encroached into the mid channel (Toth 1990). These conditions, coupled with a lack of exposed sandbars, render the remnant river channels virtually unusable to shorebirds. In two years of river channel boat surveys, no shorebirds were observed using remnant river channels.

Reference Condition: National Audubon Society Wardens frequently reported shorebirds on historic Kissimmee River trips. Wardens observed 946 shorebirds on river trips between 1948 and 1954 (National Audubon Society 1948-54) and it is likely that the wardens did not document every bird that they observed (Frohring et al. 1988). These data were combined with recent surveys of the Myakka River in Southwest Florida to develop expected species lists for the restored Kissimmee River.

The Myakka River is a free-flowing river which is sparsely developed at the upper end and has flow and habitat characteristics similar to the historic Kissimmee. Although the majority of adjacent land cover is forest, the upper portion of the river supports emergent marshes like those in the historic Kissimmee River system. Only data from river miles with adjacent marshes were used as reference data.

Eleven species were recorded from surveys of the historic Kissimmee River and the Myakka River (Table 1). The Myakka River also was used as a reference site for expected relative abundance of shorebirds in the restored Kissimmee River. A total of 90 shorebirds were observed in three years of river surveys of the Myakka river (FDEP unpubl.). Monthly relative abundance of shorebirds was averaged over each twelve month period to get mean annual relative abundance. Mean annual relative abundance of shorebirds from April 1993 through March 1996 ranged between 4-9% of all non-passerine bird observations on the Myakka River (Table 2).

Mechanism for Achieving Expectation: Re-establishment of flow through river channels will greatly improve water quality and habitat conditions for small fishes (Toth 1991, Trexler 1995). Availability of fish should

lead to an increased number of terns and gulls foraging on the Kissimmee River. In addition, flushing of the channels and re-established flow regimes will facilitate sandbar formation (Toth 1991), increasing available foraging habitat for sandpipers. Available space rather than food abundance seems to be most important to foraging sandpipers (Recher 1966). Sandbars also provide important resting or loafing areas for gulls and terns. Most shorebirds are migratory and occur in Florida primarily during winter (Stevenson and Anderson 1994).

Adjustments for External Constraints: Habitat loss on the northern breeding grounds as well as key wintering areas have detrimentally affected shorebird populations (Helmers 1992). Therefore, historic population levels of wintering shorebirds in the Kissimmee valley may not be replicated. Conditions elsewhere in the state may influence the magnitude of shorebird response to Kissimmee River restoration. Good conditions outside the Kissimmee Basin may disperse wintering birds across a greater area, thereby lessening the apparent response to restoration.

Means of Evaluation: Monthly boat surveys will be conducted along baseline survey routes. Post-restoration data will be compared to baseline data collected in a similar manner. Shorebirds are expected to make up 4-8% of all bird observations except songbirds when monthly counts are averaged over each twelve month sample period.

Time Course: Nearshore littoral habitat will improve quickly due to flushing of organic material and a reduction in coverage of floating emergent vegetation, which will occur as soon as water begins to flow regularly through the river channels. Formation of sandbars should occur within one wet season after flows are re-established through river channels. All of the shorebird species that are expected to respond to restoration currently use habitats outside the project area. Therefore, shorebirds should begin to utilize restored habitat as soon as it becomes available.

Revised 06/18/2001

Table 1. List of shorebirds species observed on Myakka River (FDEP unpubl.) and historic Kissimmee River (National Audubon Society 1948-1954) surveys.

Species	Myakka River	Kissimmee River	Not observed but potentially present
Black-bellied Plover (*Pluvialis squatarola*)			X
American Golden-Plover (*Pluvialis dominica*)			X
Semipalmated Plover (*Charadrius semipalmatus*)		X	
Killdeer (*Charadrius vociferus*)	X	X	
Black-Necked Stilt (*Himantopus mexicanus*)	X	X	
American Avocet (*Recurvirostra americana*)			X
Greater Yellowlegs (*Tringa melanoleuca*)		X	
Lesser Yellowlegs (*Tringa flavipes*)	X	X	
Solitary Sandpiper (*Tringa solitaria*)			X
Spotted Sandpiper (*Actitis macularia*)			X
Semipalmated Sandpiper (*Calidris pusilla*)			X
Western Sandpiper (*Calidris mauri*)			X
Least Sandpiper (*Caladris minutilla*)	X		
Pectoral Sandpiper (*Calidris melanotos*)			X
Stilt Sandpiper (*Calidris himantopus*)			X
Dowitcher spp.			X
Common Snipe (*Gallinago gallinago*)	X	X	
American Woodcock (*Scolopax minor*)			X
Laughing Gull (*Larus atricilla*)			X
Ring-Billed Gull (*Larus delawarensis*)		X	
Herring Gull (*Larus argentatus*)		X	
Gull-billed Tern (*Sterna nilotica*)			X
Caspian Tern (*Sterna caspia*)	X		
Royal Tern (*Sterna maxima*)			X
Forster's Tern (*Sterna forsteri*)			X
Least Tern (*Sterna antillarum*)			X
Black Skimmer (*Rynchops niger*)	X	X	

Table 2. Mean number of shorebirds per survey and mean annual relative abundance of shorebirds on the Myakka River during monthly boat surveys from April 1993-March 1996 (FDEP unpubl.).

Sample Year	Shorebird Observations (mean $\pm$ se)	Relative Abundance (mean $\pm$ se)
93/94	44.8 $\pm$ 10.3	0.04 $\pm$ 0.01
94/95	75.8 $\pm$ 17.8	0.05 $\pm$ 0.02
95/96	80.9 $\pm$ 12.9	0.09 $\pm$ 0.04

References

Florida Department of Environmental Protection. unpublished data. Monthly wildlife surveys of the Myakka River.

Frohring, P. C., D. P. Voorhees, and J. A. Kushlan. 1988. History of wading bird populations in the Florida Everglades: a lesson in the use of historical information. colonial Waterbirds 11:328-335.

Helmers, D. L. 1992. Shorebird management manual. Western Hemisphere Shorebird Reserve Network. Manomet, Massachusetts. 58 pp.

National Audubon Society. 1936-59. Audubon warden field reports. Everglades National Park South Florida Research Center, Homestead, Florida.

Recher, H. F. 1966. Some aspects of the ecology of migrant shorebirds. Ecology 47(3):393-406.

Stevenson, H. M., and B. H. Anderson. 1994. The Birdlife of Florida. University Press of Florida, Gainesville, Florida.

Toth, L. A. 1991. Environmental responses to the Kissimmee River Demonstration Project. South Florida Water Management District Technical Publication 91-02. South Florida Water Management District, West Palm Beach, Florida. 96 pages.

Trexler, J. C. 1995. Restoration of the Kissimmee River: A conceptual model of past and present fish communities and its consequences for evaluating restoration success. Restoration Ecology 3(3):195-21